

U.S. Appl. No. 09/844,086  
Response and Amendment dated September 20, 2004  
Reply to Office action of September 8, 2004  
Page 2 of 6

## AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings of claims in the application:

### LISTING OF CLAIMS:

1. (Currently Amended) A method of evaluating at least six solids to determine at least one surface property of the solids or mixtures of solids, the method comprising:
  - a) supporting the solids on at least one support;
  - b) contacting the solids with an adsorbate and measuring the radiation emitted, absorbed, or altered by each of the respective solids or mixtures of solids using a detector; and
  - c) determining at least one surface property of each of the solids using the radiation measurements wherein the surface property is selected from the group consisting of number of acid sites, acid site distribution, acid site energy, acid site strength, acid site strength distribution, base site strength, number of base sites, base site distribution, ~~surface area~~, metal dispersion, exposed metal surface area, mobility of metals on the surface of a solid, ~~chemisorb properties, physisorb properties, adsorption selectivity, desorption selectivity, ion-exchange capacity~~, and combinations thereof.
2. (Original) The method of Claim 1 wherein the radiation and detector are those used in a technique selected from the group consisting of infrared spectroscopy, ultraviolet spectroscopy, visible spectroscopy, fluorescence,

U.S. Appln. No. 09/844,086  
Response and Amendment dated September 20, 2004  
Reply to Office action of September 8, 2004  
Page 3 of 6

infrared thermography, nuclear magnetic resonance, electron paramagnetic resonance, x-ray adsorption, x-ray photoelectron spectroscopy, Raman spectroscopy, and combinations thereof.

3. (Previously Presented) The method of Claim 1 further comprising comparing the determined surface properties of the solids to each other or to a standard.
4. (Cancelled).
5. (Previously Presented) The method of Claim 1 further comprising contacting the solids with a stream of inert fluid prior to the contacting with an adsorbate.
6. (Previously Presented) The method of Claim 5 further comprising measuring the radiation emitted, absorbed, or altered by the respective solids using the detector during the contacting of the solids with a stream of inert fluid to generate a baseline.
7. (Original) The method of Claim 1 further comprising correcting the measurements collected during the contacting with an adsorbate by subtracting a baseline.
8. (Previously Presented) The method of Claim 1 further comprising ramping the temperature of the solids to a predetermined maximum temperature while contacting the solids with a stream of inert fluid prior to contacting with an adsorbate.
9. (Previously Presented) The method of Claim 8 further comprising measuring the radiation emitted, absorbed, or altered by the respective solids using the detector during the contacting of the solids with a stream of inert fluid in order to generate a baseline.

U.S. Appln. No. 09/844,086  
Response and Amendment dated September 20, 2004  
Reply to Office action of September 8, 2004  
Page 4 of 6

10. (Previously Presented) The method of Claim 9 further comprising correcting the measurement obtained for each of the solids measured during contacting with an adsorbate by subtracting the baseline of Claim 9.
11. (Previously Presented) The method of Claim 1 wherein the solids are selected from the group consisting of inorganic solids and organic solids.
12. (Previously Presented) The method of Claim 1 wherein the solids are selected from the group consisting of catalysts, adsorbents, polymers, ceramics, metals, and various types of carbons.
13. (Previously Presented) The method of Claim 1 wherein the solids are selected from the group consisting of molecular sieves including zeolites, aluminas, silicas, amorphous silica aluminas, zirconias, mixed metal oxides, clays, ion exchange resins, and polymers.
14. (Original) The method of Claim 1 wherein the support comprises a plurality of wells.
15. (Previously Presented) The method of Claim 1 wherein the adsorbate is contacted with the solids in a mode selected from the group consisting of continuous contact or pulsed contact.
16. (Original) The method of Claim 1 wherein the adsorbate is selected from the group consisting of water, pyridine, ammonia, hydrogen, nitrogen, air, helium, argon, fluorine, neon, alkanes, alkynes, alkenes, alcohols, aromatics, thiols, esters, ketones, aldehydes, esters, amides, nitriles, nitroalkanes, amines, alkylamines, quinoline, carbon monoxide, carbon dioxide, and carboxylic acids.

U.S. Appln. No. 09/844,086  
Response and Amendment dated September 20, 2004  
Reply to Office action of September 8, 2004  
Page 5 of 6

17. (Previously Presented) The method of Claim 1 further characterized in that the contacting the solids is carried out by sequential contact with two or more adsorbates of different sizes with concurrent measurement of the radiation emitted, absorbed, or altered by each of the respective solids upon contact with each of the adsorbates using the detector.
18. (Original) The method of Claim 17 further comprising desorbing adsorbed adsorbate between each sequentially contacted adsorbate.
19. (Previously Presented) The method of Claim 1 further comprising predicting the behavior of a solid based upon the surface property determined.
20. (Previously Presented) The method of Claim 1 wherein the solids contain at least twelve solids.